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AUTHORITY

ATD ltr, 2 Dec 1965

S/033/62/039/005/002/011
E032/E314

AUTHOR: Mustel', E.R.

TITLE: Longitudinal distribution of active solar regions and the problem of corpuscular disturbances

PERIODICAL: Astronomicheskiy zhurnal, v.39, no.5, 1962, 813-832

TEXT: This is a continuation of previous work by this author et al (Astron. zh., v.36, 1959, 215; v.38, 1961, 28; v.38, 1961, 385; v.35, 1958, 194; v.36, 1959, 5; v.39, 1962, 41; v.39, 1962, 619; v.38, 1961, 227; Izv. Krymsk. astrofiz. observ., v.27, 1962, 167; Dokl. AN SSSR, v.42, 1944, 117). In the present paper, the influence of the longitudinal distribution of active regions (plages) on the characteristics of the SEM (superimposed epoch method) curves is investigated. The observational material includes plages which passed through the visible centre of the solar disc during CMP or very near to it. The data were obtained from an examination of several spectroheliograms covering the interval 1907 - 1952. The entire interval is divided into 12 periods and the results of the application of the SEM are shown in Figs. 1 and 2. It is apparent from these curves that

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their most stable characteristic is the main maximum R, which is always preceded by the minimum Min. Frequently, there are further maxima R' and L. The form of the SEM curves at $\Delta t = -12^d$ and $+15^d$ is roughly the same (effect of the 27-day recurrence). A detailed statistical analysis is made of these distributions, in which histograms are obtained giving the distribution of the number of equal distances between neighbouring plages as a function of these distances for each of the above 12 periods. It was found that all the histograms had clearly defined maxima. This analysis is followed by a general explanation of the presence of the R, R' and L maxima and of the minima Min on the SEM curves which is then used to analyse each of the curves separately. The main conclusion is, as before (the present author - Astron. zh., v.39, 1962, 41), that the only stable maximum on the SEM curves is the R maximum and that all the remaining characteristics of these curves are due to the longitudinal distribution of active regions. The final section of the paper is concerned with a critique of Saemundsson's paper (Monthly Notices Roy. Astron. Soc., v.123, 1962, 299) which is

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also concerned with general statistical aspects of the origin of M-disturbances. Saemundsson has reported some doubt as to the present author's conclusion that central plages are responsible for M-disturbances. It is now argued that Saemundsson's analysis suffers from the following shortcomings: 1) the analysis was based on inadequate observational material, 2) the model used was not directly related to the previous analyses of the present author (cf. references at the beginning of this abstract) and 3) Fig.13 of Saemundsson's paper is based on plages with very different latitudes and hence does not materially contribute to the problem at hand. For these and other reasons the author considers that Saemundsson's conclusions are incorrect. There are 15 figures and 2 tables.

ASSOCIATION: Astronomicheskiy sovet Akademii nauk SSSR
(Astronomical Council of the AS USSR)

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Fig.1.

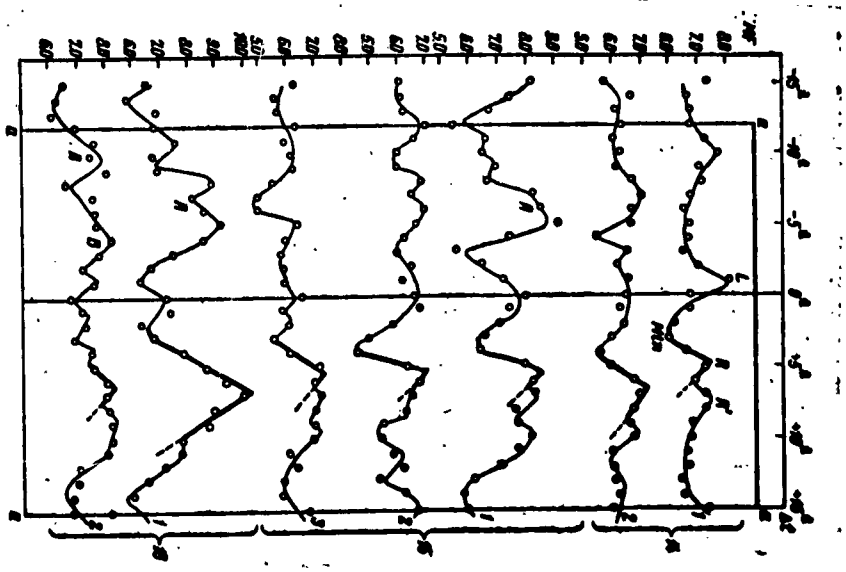

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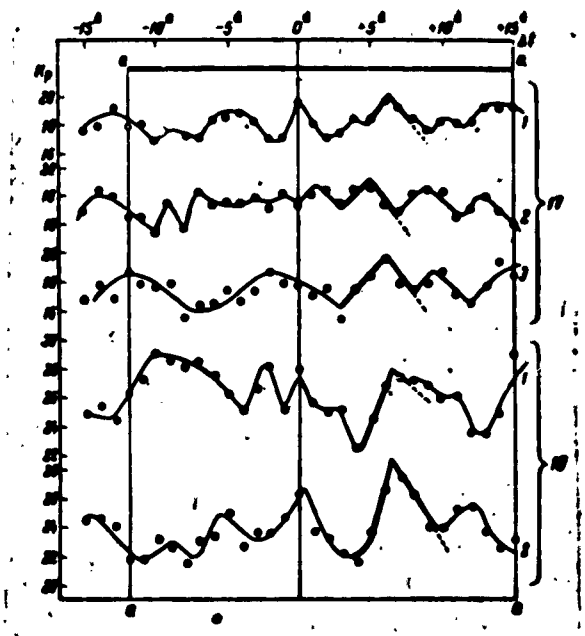
Fig. 2:



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